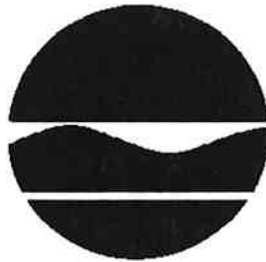


SUPERFUND STANDBY PROGRAM
New York State
Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

SITE ID 231: NIAGARA MOHAWK POWER CORPORATION
SEVENTH NORTH STREET FACILITY

SITE SUMMARY REPORT
REVISION 1



Onondaga Lake Project
Task 5: 104(e) Review

Site No. 734030-002
Work Assignment Number D003060-9

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February 1998

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1.0 SITE DESCRIPTION

In general, the information referenced in this report was obtained from the 104(e) responses of the Niagara Mohawk Power Corporation (NMPC, Company ID 2012). NMPC's initial response to the joint request for information was submitted on April 4, 1995. In this correspondence, NMPC stated that additional time was needed to complete their response to the joint request for information because of the large number of potential historic and current sites owned by NMPC in the Onondaga Lake area. NMPC provided a more complete response to the joint request for information on April 28, 1995 (see TAMS' Completeness Review A dated July 31, 1995). NYSDEC and USEPA submitted a request for additional information to NMPC on January 4, 1996. NMPC provided a supplemental response dated February 9, 1996 (see TAMS' Completeness Review B dated August 29, 1996). Additional material was provided by NYSDEC on several occasions throughout the review period.

1.1 Location

NMPC has hundreds of "facilities" throughout its system. NMPC and its predecessors have a history of operation that dates back to the 1840s. NMPC provided a list of all facilities within a 50-mile radius of Onondaga Lake (Mailing No. 2, pp. 000031 - 000036) that may have generated, handled, transported, treated, stored or disposed of hazardous substances or wastes. Of these, NMPC has identified six sites within the Onondaga Lake watershed that it believes fall within the request for information, including the former Hiawatha Boulevard Manufactured Gas Plant (MGP) (Site 227), the former Erie Boulevard MGP (Site 228), the former Solvay Bridge Street facility (Site 229), the Syracuse Fire Training Center (Site 230), the Seventh North Street facility (Site 231) and the former Wallace Street Garage (Site 232). This report summarizes the information provided for

the Seventh North Street site only. The location of this site relative to Onondaga Lake is shown in Figure 1.

The Seventh North Street Transfer, Storage and Disposal Facility (TSDF), is located at 7437 Henry Clay Boulevard in the Town of Clay, New York and covers an area of approximately 119 acres (NYSDEC, 1997). NMPC operates its Regional Service Center at this location. The site is also used for the temporary storage of NMPC generated hazardous wastes under a Part 373 permit. This facility has been in operation since the late 1950s. Recorded hazardous waste management activities began in 1966. According to the NYSDEC Project Manager for this site, Seventh North Street originally intersected Henry Clay Boulevard when the facility was built in the late 1950s. Since that time, road construction has changed the configuration of roadways in the area so that the two streets no longer cross near the site. A site facility map is included as Figure 2.

1.2 Geology

The surficial geology of the Syracuse area was strongly influenced by the most recent glacial advance (Wisconsin age, 12,000 to 14,500 years ago). Syracuse occupies a region that was covered by Lake Iroquois, a large glacial lake situated in front of the ice margin. The broad flat-lying plains situated from Syracuse north to Lake Ontario were formed beneath Lake Iroquois and are characterized by lacustrine fine sand and silt deposits. Additional glacial features which are common to the region are moraines, drumlins, U-shaped valleys and meltwater channels. The last of these features is important in understanding the geology at the NMPC Seventh North Street site. Onondaga Lake and all its major tributaries lie within glacial meltwater channels. These features originally formed as a conduit to carry meltwater away from the glacier. They typically transmitted large volumes of water at high velocities. Sediment types characteristically found in

meltwater channels are sands and gravels. In the Syracuse region, these relict features form important water bearing and transmitting units which lie in an irregularly branching, net-like pattern throughout the area.

The bedrock geology of the greater Syracuse area includes Lower to Middle Paleozoic age sedimentary rocks predominated by carbonate (dolostone and limestone) and shale and containing some sandstone, siltstone and evaporites. Bedrock directly beneath the NMPC Seventh North Street site in the Town of Clay (as well as underneath Onondaga Lake) is the Silurian Vernon Shale (Rickard and Fischer, 1970) which has low permeability, but does possess secondary porosity due to fractures.

1.3 Hydrogeology

According to the USGS Brewerton, NY Quadrangle map, and data provided by NMPC, the ground surface elevations at the site range from 420 ft to 458 ft NGVD. Boring logs included for the Seventh North Street TSDF RCRA Facility Investigation (RFI), dated February 1996, prepared by Blasland, Bouck & Lee (BBL)(pp. 001040 - 001092), indicate that subsurface conditions at the site consist of a layer of till over shale bedrock. The till is predominately silt with some clay and sand. Depth to bedrock ranges from 4.6 ft to 19.6 ft below ground surface (bgs). Depth to groundwater varies across the site, ranging from 2 ft to 20 ft bgs. When bedrock surface elevations are compared to groundwater elevations, it becomes apparent that in the southwestern and northeastern portions of the site, groundwater is present in the overburden soils, while in the central portion of the site, the water table aquifer is in the bedrock (p. 000900). Groundwater flow direction is generally to the southwest towards Sawmill Creek, a tributary of Onondaga Lake.

1.4 Surface Water Hydrology

Stormwater is managed through a series of catch basins, storm drains, outfalls and drainage swales throughout the site (see Figure 2). There is a separate stormwater piping system associated with the Energy Management System (EMS) building on the eastern side of the site. Outfalls discharge into drainage swales located along the western property boundary. Water flows off-site through a culvert under the railroad tracks and discharges to Sawmill Creek which flows along the western side of the site. The site is approximately 2.5 miles upstream of Onondaga Lake.

2.0 SITE HISTORY

2.1 Owners/Operators

NMPC owns and operates hundreds of sites in the Onondaga Lake drainage basin. Many of these sites are small electric substations and natural gas regulating stations. NMPC identified six sites that it believes fall within the requirements of the 104(e) request for information. NMPC did not include a history of the predecessor companies that were merged to form the present day corporation. This Site Summary Report is specific to the Seventh North Street facility.

The Seventh North Street TSDF and Service Center has been in operation since the late 1950s (p. 000721). The service center operations include vehicle maintenance, a storage garage, a warehouse that serves as the main supply depot for the Central Operating Division, a gas and electric meter shop (location of acid crock), a transformer shop, a NYSDOH approved analytical laboratory, the EMS building which is used for monitoring and control of NMPC's electric operating system, and a Part 373 hazardous waste management facility. The facility also includes two outdoor electrical substations, the Seventh North Substation and the Woodard Substation. In 1982, NMPC submitted a Solid Waste Management Permit Application to NYSDEC for storage of hazardous wastes in accordance with State regulations. The site was designated as an interim status TSDF in 1985 when the regulations in 6 NYCRR Part 373-2.1(d) were promulgated. NMPC obtained final TSDF status for the Seventh North Street site in June 1994, Permit No. 7-3124/00001-0 (p. 000722).

2.2 Site Operations

The Seventh North Street TSDF is the Regional Service Center for the Central Operating Division. On-site facilities include a vehicle maintenance/storage garage, a warehouse that serves as the main supply depot for the Central Operating Division, a gas and electrical meter shop, a transformer shop, an analytical laboratory, and a Part 373 hazardous waste management facility.

Hazardous waste materials are stored or handled in two areas of the facility, the Transformer Shop and the Hazardous Waste Management building. The Transformer Shop was constructed in 1966 and has three diked areas and a pit which are used for the temporary storage of PCB contaminated waste and spent solvents. Hazardous wastes are stored in these areas for less than 90 days before transfer to the Hazardous Waste Management building.

The Hazardous Waste Management building is designed specifically for the storage of hazardous wastes. A diked tank storage area is located inside the building which contains five bulk storage tanks. Tank #7 is a 10,000-gallon above-ground steel storage tank used for the storage of PCB contaminated waste oil. Tank #8 is an 8,000-gallon above-ground steel storage tank used for the storage of non-hazardous, non-reusable waste oils regulated by NY State. The other three tanks are used for the storage of new oil.

Prior to 1980 and the implementation of the TSCA regulations, used transformer oil at the site was segregated and stored in an above-ground tank behind the Transformer Shop. NMPC stated that it was their policy to reuse this oil to the maximum extent possible. Oil reprocessing equipment was located at the former NMPC Solvay Bridge Street site

(Site ID 229). NMPC did, on occasion, sell used transformer oil to outside vendors when storage capacity and reuse needs were exceeded.

The following types of wastes have been stored at the Seventh North Street facility (pp. 000018 - 000020):

- PCB contaminated equipment (transformers, capacitors, regulators, circuit breakers, reclosers and cable) that is determined to be no longer usable after inspection and/or testing;
- PCB contaminated oils (50 milligrams per kilogram [mg/kg] to 449 mg/kg PCBs) manifested and delivered to the facility;
- PCB contaminated oil (50 mg/kg to 449 mg/kg PCBs) removed from transformers at the facility;
- PCB oil (500 mg/kg PCBs or greater) removed from transformers at the facility;
- Gas regulators removed from service, which contain approximately one fluid ounce of mercury. Other miscellaneous mercury containing devices, such as switches, and thermometers, are also stored. These devices are classified as D009/U151 and are subject to hazardous waste manifesting regulations;
- Spent industrial batteries (lead-acid) generated at the Service Center or in the field at emergency power locations. This waste is exempt from hazardous waste manifesting and facility permitting regulations since it is destined for reclamation and is reused or recycled;
- Safety Kleen parts washer solvent generated from parts cleaners located at the Service Center. This material is classified as D001 waste. The material is stored less than 90 days and is handled by Safety Kleen;

- Used engine lubricating oil generated at the Service Center's garage as a result of routine maintenance of fleet vehicles. This waste is exempt from hazardous waste manifesting since it is destined for reclamation and is reused or recycled;
- Used oil filters generated as a result of routine fleet vehicle maintenance. The used filters are hot drained and then crushed prior to off-site recycling by Safety Kleen. These filters are exempt from hazardous waste manifesting since they are destined for reclamation and are reused or recycled;
- Halogenated solvent contaminated oil generated from the overhauling of breakers, transformers and hydro units (governor and bearing). The oils become contaminated through incidental contact with 1,1,1-trichloroethane. Oils containing greater than 1,000 mg/kg of 1,1,1-trichloroethane are manifested as hazardous waste liquid, not otherwise specified (N.O.S.) and delivered to the facility;
- Spent solvents resulting from the cleanup and maintenance of electrical equipment, including materials such as Inhibisol, and Ashland 2522 and 0618, which contain 1,1,1-trichloroethane;
- D001/D008 - Lead and chromium contaminated material generated from the sandblasting of lead paint at NMPC's facilities or from other used paints;
- D018 - Petroleum storage tank bottoms generated from the repair and maintenance of petroleum storage tanks;
- D019 - Carbon tetrachloride generated from the change out of substation power fuses which contain carbon tetrachloride;
- D039 - Tetrachloroethylene generated from the use of petroleum naphtha solution to degrease automotive and other equipment parts; and,
- Laboratory wastes generated at NMPC's System Chemistry Laboratory. These wastes are stored in 5-gallon pails at the lab prior to transfer to the Hazardous Waste Materials building where the waste is stored in 55-gallon drums.

Waste engine oil is stored in an underground storage tank (UST) located just outside the garage. Waste engine oil is removed by contractors who are called when the UST is observed to be nearing capacity.

2.3 Generation and Disposal of Wastes

The Seventh North Street TSDF stores or handles hazardous waste in two areas of the facility, the Transformer Shop and the Hazardous Waste Management (HWM) building. The Transformer Shop contains three diked areas and a pit which are used for the temporary storage of PCB contaminated material and solvent wastes. This material is then transferred to the HWM building for storage prior to ultimate disposal. The HWM building has five bulk storage tanks. One tank is for the storage of PCB contaminated waste oil. A second tank is used for the storage of non-hazardous, non-reusable oils regulated under NYSDEC regulations. The remaining three tanks are used for the storage of new oil for future use.

Prior to 1980 and the promulgation of TSCA, NMPC segregated used transformer oil and stored it in an above-ground tank located behind the Transformer Shop. Oil was reused to the maximum extent possible. Oil reprocessing equipment was located at the former Solvay TSDF. The Solvay facility (Site ID 229) is discussed in a separate Site Summary Report (TAMS, November 25, 1997). NMPC stated that when reuse requirements were exceeded or storage capacity was reached, some used oil was sold to outside vendors. On occasion, waste oil was sold to outside buyers to be reused for other purposes such as cutting oil (p. 000017). NMPC stated that information it gathered for ongoing litigation for the York Oil Superfund Site indicated that the Seventh North Street facility utilized three vendors for waste oil disposal, including Northeast Oil, Pierce Oil and Seitz Oil

(p. 000025). However, NMPC stated in its initial submission that they believed that Sietz Oil was the primary vendor at this facility (p. 000017). Currently, all wastes are manifested for off-site disposal.

3.0 POTENTIAL PATHWAYS FOR RELEASE OF HAZARDOUS SUBSTANCES TO THE LAKE SYSTEM

3.1 Soil

Surface soil samples were collected for chemical analyses at the site as a part of NMPC's RFI. Surface soil samples collected in the vicinity of the Electric Meter Shop Acid Crock were analyzed for PCBs and volatile organic compounds (VOCs). Results of surface soil sampling reported PCBs slightly above the 1 mg/kg recommended surface soil cleanup objective (NYSDEC TAGM #HWR-94-4046, January 24, 1994) at a former storm sewer outfall (estimated concentration of 1.4 mg/kg) and one location behind the HWM building (estimated concentration of 2.4 mg/kg). All targeted VOCs in surface soil samples were reported at concentrations below their respective NYSDEC recommended soil cleanup objectives (p. 001134). A more in-depth discussion of the reported data is contained in Section 5.3 of this report.

Analytical results from subsurface soil samples collected at the site also reported concentrations of contaminants above the NYSDEC recommended soil cleanup objectives. PCBs were detected at concentrations up to 120 mg/kg, significantly above the NYSDEC recommended subsurface soil cleanup objective (10 mg/kg), in samples collected in the vicinity of the acid crock (p. 001133). VOCs were also detected at concentrations above the NYSDEC recommended soil cleanup objectives in soil samples collected in the vicinity of the acid crock. 1,1-Dichloroethane and 1,1,1-trichloroethane were detected at concentrations (0.28 mg/kg and 18 mg/kg, respectively) slightly above their respective NYSDEC recommended soil cleanup objectives (0.2 mg/kg and 0.8 mg/kg, respectively). Toluene was detected at a concentration of 50 mg/kg, which is significantly above the recommended soil cleanup objective of 1.5 mg/kg (p. 001135). Benzo(a)pyrene, a

polycyclic aromatic hydrocarbon (PAH), was detected at concentrations (up to 0.16 mg/kg) above the NYSDEC recommended soil cleanup objective of 0.061 mg/kg in soil samples adjacent to two catch basins and behind the HWM building (p. 001137). All target analyte list (TAL) metals were detected at concentrations similar to background samples collected at soil borings TB-27 and MW-4 located in the northeast corner of the site (p. 000817).

3.2 Surface Water

The Seventh North Street site is separated from Sawmill Creek by Conrail railroad tracks. On-site stormwater runoff is directed into a series of drainage ditches which flow into a culvert that passes under the railroad tracks and into Sawmill Creek. Analytical data from on-site soil borings and monitoring wells indicate that site operations have impacted subsurface soils and groundwater. Sediment samples collected from the drainage ditches on-site also indicate that contaminants have reached the ditches and impacted the sediment. Limited analyses of sediment samples collected from the culvert that passes under the Conrail tracks at the western property boundary just upstream of Sawmill Creek indicated PCBs at concentrations of 0.58 and 0.62 mg/kg. These concentrations are greater than the site-specific screen guidance value of 0.1 mg/kg as calculated by BBL using the NYSDEC wildlife bioaccumulation criterion of 1.4 $\mu\text{g/g-oc}$ (organic carbon normalized) (NYSDEC, 1993) and an average total organic carbon (TOC) content of 67,000 mg/kg (p. 000770 - 000771, 000818).

Surface water samples were collected for chemical analyses at the site. Several samples were collected from the drainage ditches adjacent to the railroad tracks. Samples were analyzed for PCBs, VOCs, semi-volatile organics (SVOCs) and inorganic constituents. According to BBL, NMPC's consultant, only chloroform was reported above the

NYSDEC water quality standards for Class A waterbodies. However, as Sawmill Creek is a Class C waterbody adjacent to the site, the exceedance is not directly applicable to the standard (p. 000819). A discussion of the surface water and sediment data is contained in Section 5.3 of this report.

A study of the aquatic biota in the on-site drainage ditches and pond was conducted by NMPC in 1996. Fish and frogs were selected as the biota for chemical analyses. Specimens were collected from five areas in the waterbodies on the western side of the site and were analyzed for PCBs, PAHs and percent lipids. Biota were not analyzed for metals. PCBs and PAHs were detected in both specimen groups (NMPC, August 1996 letter report to NYSDEC). A discussion of the biota data and its significance is contained in Section 5.3 of this report.

Sampling of Sawmill Creek (sediment, surface water and biota) was not conducted by NMPC during this investigation.

3.3 Groundwater

Groundwater samples collected at one of the thirteen on-site monitoring wells reported two VOCs above the NYSDEC Class GA groundwater standards. 1,1-Dichloroethane was detected at a concentration slightly above the Class GA groundwater standard ($5 \mu\text{g/L}$) and 1,1,1-trichloroethane was detected at a concentration significantly above the Class GA groundwater standard ($5 \mu\text{g/L}$). Inorganic constituents reported at concentrations above the standards at five of the monitoring wells, including the background monitoring well, include arsenic, chromium, lead, manganese, selenium, sodium, thallium and zinc. A discussion of the groundwater data is contained in Section 5.3 of this report.

3.4 Air

Air samples were not required as part of the RFI. Consequently, there is no air data to review for the Seventh North Street facility.

3.5 County Sewer System

The Seventh North Street site is connected to the Town of Clay sanitary sewer system. However, floor drains and storm sewers at the site discharge to four surface water outfalls designated A through D. The EMS building discharges to Outfall E. All five outfalls, as shown in Figure 2, discharge to a series of drainage ditches that eventually connect up to a culvert which passes under the Conrail railroad tracks west of the site and discharges into Sawmill Creek (p. 001129). It is not known whether any process wastewater, if generated, was discharged to the sanitary or storm sewers. According to NYSDEC (personal communication, January 1998), NMPC is not required to have a SPDES permit for this site.

4.0 LIKELIHOOD OF RELEASE OF HAZARDOUS SUBSTANCES TO THE LAKE SYSTEM

4.1 Documented Releases

Historical Releases and Corrective Measures

Several discharges were noted for the Seventh North Street site (pp. 000467 - 000468). In February 1995, an unknown quantity of laboratory wastes was discharged through the sinks at the facility. Due to inadequate plumbing, these wastes apparently entered one of the catch basins. In December 1994, a hydraulic hose on an NMPC truck ruptured, spilling approximately 30 gallons of hydraulic oil onto a parking lot. In May 1994, a hydraulic line on the rotogator failed discharging approximately 195 gallons of hydraulic oil in the Investment Recovery Granulator Room. As the PCB content of the hydraulic oil from these two spills was not listed by NMPC in their response, it is not known whether or not the hydraulic oils contained PCBs. In February 1994, a forklift accident resulted in the discharge of approximately 55 gallons of mineral oil (less than 2 mg/kg PCBs). The location of the spill was not specified. Three other minor spills of less than 5 gallons of mineral oil were noted in the NMPC submissions.

As part of the RFI, NMPC implemented several Interim Corrective Measures (ICM) to address the potential spread of contamination as documented in NMPC's Focused Corrective Measures Study Report (BBL, 1997) and NYSDEC's Statement of Basis (1997). Debris samples and dry-weather flow samples were collected from catch basins associated with the site-wide storm/industrial sewer system. These samples indicated the presence of PCBs, VOCs, SVOCs, chromium, lead, mercury and zinc. Although no specific cleanup standard was issued for storm sewer debris, NMPC concluded that the

presence of these contaminants in the catch basins and sewer system could act as a source of contamination to the drainage ditches. According to NYSDEC's Statement of Basis (1997), this sewer system was the "primary source and pathway of contamination to the on-site drainage ditches." The storm sewer system was hydroflushed in 1996 to remove accumulated debris. Solid waste debris was collected and placed in roll-off containers for off-site disposal at the Chemical Waste Management Model City, New York facility. Wash water was collected and pretreated on-site prior to off-site disposal at the CECOS facility in Niagara Falls, New York (BBL, 1997).

A second ICM addressed contaminated soil found adjacent to the Electric Meter Shop Acid Crock. Soils in this area were contaminated with PCBs and VOCs. A total of 356 cubic yards of soil was removed during this ICM. Post excavation soil sampling indicated that all contaminated soil in this area had been removed (NYSDEC, 1997, p. 15) .

A third ICM addressed contaminated soil located beneath the Electric Meter Shop building. Soils adjacent to the building footer and beneath the floor of the building were contaminated with PCBs (greater than 50 mg/kg) and one VOC (1,1-dichloroethane). NMPC determined that it was not feasible to remove all contaminated soils from beneath the building without resulting in potential structural damage. NMPC implemented an alternative cleanup measure of removing approximately 60 cubic yards of soil beneath the building that contained PCBs at concentrations greater than 50 mg/kg (BBL, 1997, p. 2-5). Post excavation soil sampling indicated that PCB concentrations had been reduced to less than 50 mg/kg. Since the remaining soil beneath the building contained PCBs and 1,1-dichloroethane at concentrations above the NYSDEC-recommended soil cleanup objectives, NMPC was required to conduct a long-term groundwater monitoring program to evaluate the effectiveness of the excavation activities (NYSDEC, 1997, p. 16).

Ongoing Releases

Sediment sampling at the site revealed the presence of PCBs, SVOCs, cadmium, chromium, copper, lead, mercury and zinc at concentrations above the site-specific guidance values (p. 000777). A biota study also found PCBs and PAHs in fish and frogs residing in the drainage ditches along the western side of the site just upstream of Sawmill Creek.

NYSDEC issued a Statement of Basis (May 14, 1997) for the site to address the sediment contamination in the drainage ditches and resident biota. The selected remedy will include the excavation of approximately 10,000 cubic yards of sediments from the drainage ditches and a long-term study of the biota in the ditches to evaluate the effectiveness of the remediation. Also, post-remedial monitoring of storm sewers and groundwater will be required to ensure that contaminant sources have been eliminated.

4.2 Threat of Release to the Lake System

4.2.1 Extent of Site Contamination

Results from the RFI reported soil contamination above the NYSDEC-recommended soil cleanup objectives at several locations. PCBs were detected above the 1 mg/kg surface soil cleanup objective adjacent to a catch basin near Outfall B. PCBs were also detected above the 10 mg/kg subsurface soil cleanup objective in six soil borings in the vicinity of the Electric Meter Shop Acid Crock. VOCs (including 1,1-dichloroethane, 1,1,1-trichloroethane and toluene) were also detected above the NYSDEC-recommended soil cleanup objectives at the Acid Crock. Benzo(a)pyrene, a PAH, was reported above the NYSDEC-recommended soil cleanup objective adjacent to two catch basins and in a

soil boring behind the HWM building. The RFI reported that inorganic parameters in soils were found at concentrations similar to those reported in background samples.

Chemical results of sediment sampling at the site reported exceedances of the site-specific guidance values (based on NYSDEC, 1993) for PCBs, SVOCs or metals at 39 of 44 sampling locations in drainage ditches located on-site and in the culvert running under the railroad tracks adjacent to the site. PCBs were reported above the 0.1 mg/kg site-specific guidance value at 38 locations. SVOCs, including benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene, were reported above the site-specific guidance values at 15 sampling locations. Inorganic constituents (including cadmium, chromium, copper, lead, mercury and zinc) were also reported above the site-specific guidance values at several sampling locations. Two surface sediment samples collected immediately off-site in the drainage ditch leading to Sawmill Creek, downstream of the on-site ditch, reported total PCB concentrations of 0.58 mg/kg and 0.62 mg/kg. These concentrations are slightly above the site-specific guidance value for total PCBs of 0.1 mg/kg but less than the cleanup standard of 1 mg/kg proposed in the Statement of Basis, based on the NYSDEC-recommended surface soil cleanup objective (p. 18 of 23, 1997). Also, a subsurface sediment sample (0.5 - 1.2 ft below the sediment/water interface) at one of these locations contained an estimated 0.055 mg/kg of total PCBs. Sediment samples were not collected in Sawmill Creek by NMPC.

Four sediment samples were collected in Sawmill Creek downstream of the site by NYSDEC personnel in November 1996. The nearest sample to the Seventh North Street site is SM-4, which was collected approximately 2,700 ft downstream of the culvert leading from the NMPC site to Sawmill Creek. This sample reported PCB Aroclor 1260 at a concentration of 100 µg/kg (0.1 mg/kg). The remaining PCB Aroclors were not

detected at this location. The PCB Aroclors were not detected (less than 25 µg/kg) at each of the three locations (SM-1, SM-2 and SM-3) downstream of location SM-4. Total PCB concentrations were not reported.

4.2.2 Migration Potential of Contaminants

Environmental media at the site were contaminated with a wide spectrum of contaminants including VOCs with a relatively high migration potential such as 1,1,1-trichloroethane in groundwater at one on-site location, to site-wide contaminants such as PCBs in soils which have a relatively low migration potential. Soil contamination was addressed in two ICMs which resulted in the excavation and removal of contaminated soils. Concentrations of 1,1-dichloroethane above the recommended soil cleanup objectives (NYSDEC, 1994) remain in soils beneath the Electric Meter Shop building. VOCs, including 1,1-dichloroethane and 1,1,1-trichloroethane, were detected in only one on-site monitoring well at concentrations above the Class GA groundwater standards and do not appear to be migrating beyond the source area. As part of the Final Site Remedy as proposed in the Statement of Basis, groundwater will be monitored to verify that this contamination is not migrating beyond the site boundaries. One VOC, chloroform, was detected in a surface water sample at a concentration slightly above the NYSDEC Class A surface water standard.

Several VOCs were detected in surface sediment samples but at concentrations below the site-specific guidance values. Sediments in the on-site drainage ditches reported SVOCs and PCBs above the site-specific guidance values. PCBs and PAHs are bioaccumulating in fish and frogs that reside in the drainage ditches. Limited off-site sediment sampling reported total PCBs at concentrations of 0.62 and 0.58 mg/kg, slightly above the site-specific guidance value of 0.1 mg/kg. Approximately 10,000 cubic yards of

sediments in the on-site drainage ditches will be excavated as part of the Final Site Remedy followed by long-term monitoring of resident biota. NYSDEC's sampling of Sawmill Creek sediment in November 1996 reported PCB Aroclor 1260 at a concentration of 0.1 mg/kg approximately one-half mile downstream of the site. Thus, it is possible that PCBs from the site have reached the lake system.

5.0 POTENTIAL FOR ADVERSE IMPACTS TO LAKE SYSTEM DUE TO A RELEASE OR THREAT OF A RELEASE

The Seventh North Street site is adjacent to Sawmill Creek and approximately 2.5 miles upstream of Onondaga Lake. Sediment samples collected from on-site drainage ditches reported PCBs, SVOCs and several metals at concentrations above site-specific guidance values calculated by NMPC's consultant using NYSDEC protocols (NYSDEC, 1993). The data indicate that on-site activities have impacted the sediments in the drainage ditches. As part of the RFI, two off-site sediment samples were collected in the drainage ditch leading to Sawmill Creek. BBL reported concentrations of PCBs and SVOCs slightly above the site-specific guidance values. Several metals were also present at concentrations above the site-specific guidance values. BBL speculated that the exceedances may be associated with off-site sources (including the railroad and/or other industrial facilities in the vicinity) other than the Seventh North Street facility, or may represent naturally occurring background levels (p. 000818). The current threat to the lake system appears to be low as these constituents have relatively low migration potentials. However, due to the length of time this facility has been in operation and the unknown quantities of contaminants released via the storm sewer system, the historic potential for these contaminants to have reached the lake system is higher.

5.1 Hazardous Substance Characteristics

The primary contaminants of concern at the site include PCBs and PAHs. Other contaminants have been identified to a lesser extent including halogenated and chlorinated VOCs, SVOCs, and several metals including chromium, lead and mercury. With the exception of the sediments in the drainage ditches, the sources of contamination identified during the RFI have been remediated as part of the interim corrective measures

implemented by NMPC. A Statement of Basis has been issued by NYSDEC to address the contamination in the drainage ditches. The final remedy will be to excavate contaminated sediments within the drainage ditches along the western property boundary for off-site disposal followed by long-term monitoring.

Mobility

Volatile organics, including chloroform, 1,1-dichloroethane and 1,1,1-trichloroethane, rapidly volatilize into the atmosphere where photooxidation produces hydrochloric acid, carbon monoxide, carbon dioxide and carboxylic acid. In surface waters, dissolved VOCs will rapidly volatilize into the atmosphere where photooxidation will occur. In soil, VOCs are considered very mobile under most subsurface conditions and will readily leach into groundwater. The solubility for chloroform is very high, giving this compound a very high mobility in water. Chlorinated solvents, such as 1,1-dichloroethane and 1,1,1-trichloroethane, are significantly less soluble than chloroform but are still considered to be relatively soluble in water giving these compounds a high mobility as well. Chloroform was reported in only one surface water sample. Groundwater investigations at the facility indicate that VOCs have not migrated very far beyond the source area at the HWM building.

PAHs typically have relatively low mobilities. These compounds are usually categorized as dense non-aqueous phase liquids (DNAPLs) and will migrate down through the soil column and pool at aquitards or bedrock surfaces. Solubilities for PAHs decrease rapidly as the number of benzene rings increases. Naphthalene, with two rings, is relatively soluble (34.4 mg/L) while benzo(a)pyrene, with five rings is relatively insoluble (0.0038 mg/L). PAHs have high adsorption coefficients and will adsorb onto sediment particles, especially organic matter, so that sediment transport is an important fate process for these

compounds. There is some evidence that photooxidation can be an important fate mechanism for PAHs. However, the process may be inhibited by adsorption onto organic matter so that in waters with high suspended matter contents, e.g., eutrophic waters, the relative importance of photooxidation as a fate mechanism is dependent on the environmental conditions (USEPA, 1979).

PCBs generally have limited mobilities in the environment due to low vapor pressures and low water solubilities. Therefore, the primary PCB transport mechanism from the Seventh North Street facility to the Onondaga Lake system is expected to be surface water runoff or direct discharges of PCB contaminated material into the storm sewers and then into nearby creeks. Once in surface water, most PCBs are expected to partition to suspended matter and settle to the sediment, with subsequent resuspension during high flows.

The fate and mobility of chromium in sediment and soil is dependent on pH, redox potential, and sorption characteristics of the soil. Chromium in soil is predominantly in the trivalent form [Cr(III)], and as an insoluble oxide, and is therefore, not very mobile in soils. Chromium in soil can be transported to the atmosphere as an aerosol or dust.

Lead mobility in the environment is governed by a number of environmental conditions such as pH, oxidation state, and water hardness. Elemental lead (metallic lead) may also have been present as a result of the processes which occurred at NMPC facilities. However, natural weathering is ultimately expected to oxidize any elemental lead. Lead mobility in oxidized and elemental form is expected to be controlled by lead-bearing soil particle movement. As a result, site lead will be associated with soil particles and lead mobility will, in part, be governed by the same processes responsible for soil movement, i.e., surface water flow, particle size and depositional environment.

Mercury mobility is highly dependent on the speciation of the metal. Some of the complex ions are highly soluble while others are very insoluble. Metallic mercury and methylated mercury compounds tend to vaporize due to their high vapor pressure. In aquatic environments high in chloride, such as Onondaga Lake and parts of the watershed, the solubility of mercury may be greatly increased due to the formation of charged mercuric chloride complexes. Mercury also has a very high adsorption (partition) coefficient such that sediment transport is a primary transport mechanism. Mercury can remobilize after deposition in bottom sediments through biomethylation where bacteria in the sediments metabolize metallic mercury into methyl mercury compounds. These compounds can be quite mobile in the environment and bioaccumulate in many aquatic organisms (USEPA, 1979).

Toxicity

According to USEPA, 1,1-dichloroethane is a possible human carcinogen (IRIS, 1997). This determination is based upon no human data and limited evidence of carcinogenicity in lab animals. Acute exposure to high levels of 1,1,1-trichloroethane can be lethal to humans and animals, usually the result of respiratory or cardiac failure. However, long-term exposure at low to moderate concentrations has no apparent effect on animal mortality, while long-term exposure to high concentrations of 1,1,1-trichloroethane vapor can have lasting toxic effects on the human heart (ATSDR, 1990). Also, the available data are inconclusive as to the carcinogenic potential of the chemical in animals and humans and is thus not classified as carcinogenic (IRIS, 1997). 1,1,1-Trichloroethane is not known to bioconcentrate in fish and aquatic organisms and is not expected to biomagnify in the food chain (ATSDR, 1990).

Chloroform, also known as trichloromethane, had been used as an anesthetic for many years before its detrimental effects on the liver and kidneys were recognized (ATSDR, 1992). Chloroform also affects the central nervous system after breathing air or consuming liquids containing high concentrations of the substance. Chloroform is carcinogenic in animals from oral exposure. USEPA classified chloroform as a probable human carcinogen (IRIS, 1997). Epidemiologic studies showed increased incidences of gastrointestinal cancer, urinary tract cancer, brain cancer, and Hodgkin's lymphoma from chronic exposure to chloroform (and other organic contaminants) in chlorinated drinking water (ATSDR, 1992). Chloroform does not bioconcentrate in aquatic organisms. However, there are insufficient data on the biomagnification potential of chloroform in terrestrial and aquatic food chains (ATSDR, 1992).

Polycyclic aromatic hydrocarbons are a class of compounds containing two or more aromatic (benzene) rings. The toxicity of select PAHs found at the site is discussed below.

Phenanthrene and anthracene each contain three aromatic rings. Limited data exist for each substance, which are each not classifiable as to human carcinogenicity, based on no human data and inadequate data from animal bioassays (IRIS, 1997).

Chrysene, benzo(a)anthracene, benzo(b)fluoranthene, and benzo(k)fluoranthene each have four aromatic rings. Limited data exist for pyrene, which is not classified as a human carcinogen (IRIS, 1997). Chrysene is a carcinogen in animals following long-term dermal application. However, there are no studies correlating human chrysene exposure and tumor development, although there are numerous studies indicating human cancer from exposure to mixture of PAHs that include chrysene (ATSDR, 1988). Chrysene is classified as a probable human carcinogen based on animal bioassays (IRIS, 1997). PAHs,

including chrysene, accumulate in the sediment of waterbodies and in aquatic organisms. Similar to chrysene, benzo(a)anthracene is an experimental carcinogen by the dermal route of exposure. There is also some evidence that benzo(a)anthracene is carcinogenic by the oral route as well (ATSDR, 1988). Benzo(b)fluoranthene is also an experimental carcinogen by the dermal route of exposure; other routes of exposure including inhalation and oral routes were not studied for benzo(b)fluoranthene (ATSDR, 1988). According to USEPA, benzo(k)fluoranthene is classified as a probable human carcinogen, based on no human data but sufficient data from animal bioassays (IRIS, 1997). The substance produced tumors after lung implantation in laboratory animals and in skin painting studies.

Benzo(a)pyrene has five aromatic rings. Long-term exposure to benzo(a)pyrene in animal studies has resulted in the induction of cancer, by all routes for which humans would normally expect to be exposed (ATSDR, 1988). Benzo(a)pyrene is classified as a probable human carcinogen (IRIS, 1997) and is one of the most toxic PAHs, whose effects include non-cancer lung diseases, such as bronchitis, and numerous types of skin lesions. Many aquatic organisms metabolize and excrete benzo(a)pyrene rapidly, resulting in short-term bioaccumulation. Similar to other PAHs, benzo(a)pyrene can accumulate in the sediment of waterbodies and in aquatic organisms.

According to Long and Morgan (1990) as presented in NYSDEC (1993), the low and median toxic effects ("Effects Range-Low" [ER-L] and "Effects Range-Median" [ER-M]) and "Overall Apparent Effects Threshold" concentrations for benthic organisms exposed to benzo(a)pyrene are 0.4 mg/kg, 2.5 mg/kg, and 0.7 mg/kg, respectively. The ER-L and ER-M threshold concentrations for total PAHs are 4.0 mg/kg and 35.0 mg/kg, respectively. According to NYSDEC (1993), the sediment criterion for benzo(a)pyrene, based on protection for human health bioaccumulation, is 1.3 mg/kg-oc (organic carbon normalized) in freshwater systems. NMPC collected total organic carbon (TOC) data from

the sediments at the site and calculated a site-specific guidance value for benzo(a)pyrene of 0.1 mg/kg based on an average TOC of approximately 10 % (0.1 kg-oc/kg-sed). As summarized in Section 5.3, this PAH was detected in sediments at levels above the ER-M concentration (2.5 mg/kg) and the site-specific guidance value (0.1 mg/kg) in the on-site ditches flowing to Sawmill Creek.

PCBs have been shown to cause many toxicological responses including carcinogenic, reproductive, teratogenic, neurologic/developmental, systemic and immunological effects. PCBs are classified as probable human carcinogens, based on hepatocellular carcinomas in rodent studies and inadequate yet suggestive evidence of excess risk of liver cancer in humans by ingestion, inhalation or dermal contact (IRIS, 1996). Studies have demonstrated that endpoints resulting from exposure to PCBs have shifted with time, differ among species, and are dependent on dose and exposure duration. The toxicity of PCBs to aquatic and terrestrial organisms varies according to congener and aroclor composition, where, in general, the toxicity increases with increasing degree of chlorination, except for some highly-chlorinated congeners which may be physically hindered from accumulating in tissues. PCBs bioaccumulate significantly in aquatic animals and biomagnify in upper trophic levels due to consumption of contaminated prey (ATSDR, 1992).

As presented in NYSDEC (1993), the ER-L and ER-M concentrations for organisms exposed to total PCBs are 0.05 mg/kg and 0.4 mg/kg, respectively. According to NYSDEC (1993), the guidance value for total PCBs based on protection for wildlife bioaccumulation is 1.4 mg/kg-oc. At a TOC of 10%, the site-specific guidance value for total PCBs would be 0.14 mg/kg. As summarized in Section 5.3, total PCBs were detected in sediments at levels above the ER-M concentration (0.4 mg/kg) and site-specific guidance value (0.14 mg/kg) in the on-site drainage ditches.

Hexavalent chromium, Cr(VI), is classified as a human carcinogen (IRIS, 1996). Epidemiological studies of chromate facilities in the United States have found an association between chromium exposure and lung cancer. Workers are likely exposed to both trivalent chromium [Cr(III)] and Cr(VI), however, only Cr(VI) has been found to be carcinogenic in animals (IRIS, 1996). Chromium(VI) is also very toxic to aquatic organisms (USEPA, 1979). Exposure to high levels of Cr(III), although an essential element, via inhalation, ingestion, or dermal contact may cause serious health effects (ATSDR, 1992).

Lead may adversely affect survival, growth, reproduction, development, and metabolism of most species under controlled conditions, but its effects are substantially modified by physical, chemical and biological variables (Eisler, 1988). In general, organo-lead compounds are more toxic than inorganic lead compounds, food chain biomagnification of lead is negligible, and immature organisms are most susceptible to toxicity. Lead is classified as a probable human carcinogen, based on rat and mouse studies with dietary and subcutaneous exposure to several soluble lead salts (USEPA, 1995). In humans, ingestion of lead leads to symptoms such as loss of appetite, anemia, malaise, insomnia, headaches, irritability, muscle and joint pains, tremors, hallucination and distorted perceptions, muscle weakness, gastritis and liver changes. Lead is also toxic to all phyla of aquatic biota, but its toxic action is modified by species and physiological state. Wong et al. (1978) reported that only soluble waterborne lead is toxic to aquatic biota, and that free cationic forms are more toxic than complexed forms.

Mercury, in both organic and inorganic forms, is toxic to both humans and animals (ATSDR, 1989). The organic forms of mercury such as methyl mercuric chloride are usually considered more toxic than the inorganic forms such as mercuric chloride. Long-term exposure to either form of mercury can damage the brain, kidneys, and developing

fetuses. Elemental mercury is not classified as to carcinogenicity while methyl mercury and mercury chloride are classified as possible human carcinogens (IRIS, 1997). The primary route of exposure for the general population is the ingestion of methyl mercury in contaminated foodstuffs, especially fish. Methyl mercury is the form of mercury most readily accumulated and retained in the aquatic food chain (USEPA, 1979).

Persistence

In surface waters and surficial soils, VOCs will predominantly volatilize into the atmosphere where they rapidly degrade. In subsurface soils where volatilization does not readily occur, VOCs are much more persistent. VOCs will also leach from soils into groundwater. Once in groundwater, VOCs will not readily volatilize and are relatively persistent.

SVOCs, and particularly the longer-ringed PAHs such as benzo(a)pyrene, are relatively persistent in the environment. The dissolved fraction of SVOCs can undergo rapid photolysis in surface waters. However, the strong adsorption characteristics tend to inhibit photolysis. In groundwater, SVOCs are persistent.

PCBs are persistent in the environment due to their high stability and relative inertness. In aquatic systems, low amounts of PCBs are found dissolved in the water column due to their low solubility and preferential partitioning to suspended matter and sediment. In these systems, PCB transport and persistence are generally governed by the particle transport processes. PCBs have been shown to degrade to a limited extent via dechlorination.

In surface waters, no data have been found that would indicate that photolysis, biodegradation, and volatilization of chromium are important fate processes. Sorption and bioaccumulation are considered important fate processes. Chemical speciation plays an important role in the fate of chromium in surface waters. Chromium is not considered as persistent in surface waters as compared to soil and sediment (USEPA, 1979).

Lead is very persistent in both water and sediment. Since lead is an element, it cannot be broken down at all and its concentration in environmental media is governed solely by dilution mechanisms. In the environment, lead can be transformed from inorganic to organic forms, affecting its respective toxicity, but ultimately only dilution or removal affect the presence of this element.

Mercury is very persistent in the environment. Since mercury is an element, it cannot be broken down at all and its concentration in environmental media is governed solely by dilution mechanisms. Because of its strong adsorption characteristics, mercury primarily concentrates in bottom sediments. Mercury can also enter the biologic environment as bacteria metabolize metallic mercury to methyl mercury. Once in the biologic cycle, mercury compounds can maintain a dynamic system of reversible reactions which lead to a steady-state concentration of methyl mercury in sediments and water. Once in the biologic cycle, methyl mercury is very persistent (USEPA, 1979).

Bioaccumulation

Bioaccumulation is not an important process for chloroform, 1,1-dichloroethane and 1,1,1-trichloroethane in the aquatic environment (USEPA, 1979).

PAHs have shown rapid uptake rates in aquatic organisms from zooplankton to fish. PAHs with two to four rings are readily metabolized and excreted by organisms. The five-ringed PAHs, which include benzo(a)pyrene, are also readily bioaccumulated in organisms but the rate of metabolism is much slower (USEPA, 1979).

PCBs are very lipophilic and thus tend to bioaccumulate/bioconcentrate within living organisms. The more PCBs that are absorbed and remain in the organism, the greater the potential for toxic responses. PCBs bioaccumulate significantly in aquatic animals and biomagnify in upper trophic levels due to consumption of contaminated prey (ATSDR, 1992).

Bioaccumulation of chromium in aquatic organisms and passage through the food chain has been demonstrated. However, biomagnification through the food chain is not expected to occur. Partitioning studies indicated that the bioconcentration factor of benthic invertebrates to water is approximately 2,000 to 3,000 whereas the bioconcentration factor of benthics to sediments is less than one (USEPA, 1979). In general, chromium does not biomagnify along the terrestrial food chain from soil to plant to animal (ATSDR, 1991).

Lead tends to bioaccumulate/bioconcentrate within living organisms. However, there is no convincing evidence that it is biomagnified through food chains (Wong et al., 1978; USEPA, 1979; Settle and Patterson, 1980). In surface water, lead concentrations are usually highest in benthic organisms and algae and lowest in upper trophic level predators.

Methyl mercury is the most readily accumulated and retained form of mercury in aquatic biota. Bioconcentration factors can be high for many biota. The depurative half-life of methyl mercury in aquatic organisms has been estimated between one and three years (USEPA, 1979).

5.2 Quantity of Substance

The Seventh North Street site is currently being investigated as a condition of its RCRA permit. Three ICMs were completed in 1996. The first ICM consisted of hydroflushing the site-wide storm/industrial sewer system to remove accumulated sediment and debris from drainage structures and piping associated with the sewer system. Based on visual observations and a remote video survey of the piping, this ICM was successful in removing debris from the sewer system. The second ICM consisted of the excavation of soil adjacent to the Electric Meter Shop building. A total of 356 cubic yards of soil was excavated from the vicinity of the Electric Meter Shop Acid Crock. The third ICM consisted of the removal of an additional 40 cubic yards of soil with PCB concentrations greater than 50 mg/kg from an area adjacent to and beneath the Electric Meter Shop building. Some contaminated soil beneath the Electric Meter Shop building could not be removed without causing potential damage to the structural integrity of the building. The volume of contaminated soil remaining beneath the Electric Meter Shop building could not be quantified. In the soil beneath the building, PCB concentrations were reduced to less than 50 mg/kg and concentrations of 1,1-dichloroethane remain which are slightly above the NYSDEC-recommended soil cleanup objective of 0.2 mg/kg. The final remedy for the contaminated sediments in the drainage ditches consists of removing approximately 10,000 cubic yards of sediments.

5.3 Levels of Contaminants

In June and October 1995, seven surface soil samples were collected at the site and analyzed for PCBs and VOCs. PCB concentrations ranged from an estimated 0.027 mg/kg to an estimated 1.4 mg/kg (recommended surface soil cleanup objective of 1 mg/kg,

NYSDEC, 1994). All targeted VOCs were reported at concentrations below their respective recommended soil cleanup objectives (pp. 000754 - 000755).

Four test pits were excavated in June 1995. Analytical results from subsurface soil samples collected from test pits reported PCBs at concentrations below the NYSDEC-recommended subsurface soil cleanup objective of 10 mg/kg. All targeted VOCs were also reported at concentrations below their respective recommended soil cleanup objectives. Benzo(a)pyrene, a PAH, was detected at two locations at estimated concentrations of 0.16 mg/kg and 0.17 mg/kg (0.061 mg/kg recommended soil cleanup objective). Concentrations of TAL metals were reported at concentrations consistent with background soil samples (pp. 000755 - 000757).

Twenty-nine soil borings were drilled and sampled at the site during June and October 1995. Analytical results from subsurface soil samples reported PCBs at concentrations ranging from not-detected to 480 mg/kg in a soil boring near the acid crock (recommended subsurface soil cleanup objective of 10 mg/kg). VOCs, including 1,1-dichloroethane, 1,1,1-trichloroethane and toluene, were reported in subsurface soil at concentrations above their respective recommended soil cleanup objectives in the vicinity of the acid crock. Concentrations of 1,1-dichloroethane ranged from not-detected to an estimated 0.28 mg/kg (recommended soil cleanup objective of 0.2 mg/kg). Concentrations of 1,1,1-trichloroethane ranged from not-detected to 18 mg/kg (recommended soil cleanup objective of 0.8 mg/kg). Benzo(a)pyrene was reported above its recommended soil cleanup objective of 0.061 mg/kg adjacent to two catch basins and behind the HWM building. All inorganic constituents were reported at concentrations consistent with those reported in subsurface background soil samples (pp. 000758 - 000766, and 000817). The majority of this soil contamination, as well as the acid crock, were removed as part of an ICM in 1996. The exception is beneath the Electric Meter Shop building where complete

excavation was deemed impractical without potentially undermining the structural integrity of the building. PCB concentrations under the building were reduced to less than 50 mg/kg. However, areas remain with PCB concentrations greater than the recommended subsurface soil cleanup objective of 10 mg/kg. Concentrations of 1,1-dichloroethane in soil beneath the building also remain above the recommended soil cleanup objective of 0.2 mg/kg.

Groundwater samples were collected from three existing monitoring wells (MW-1 through MW-3) and nine monitoring wells (MW-4 through MW-12) installed as part of the RFI in July 1995. In November 1995, a second round of groundwater samples was collected from monitoring wells MW-5, MW-6, MW-11, MW-12 and MW-13 to confirm the analytical results from the July 1995 sampling event. 1,1-Dichloroethane was detected at a concentration of 18 $\mu\text{g/L}$ (5 $\mu\text{g/L}$ Class GA groundwater quality standard) and 1,1,1-trichloroethane was detected at a concentration of 130 $\mu\text{g/L}$ (5 $\mu\text{g/L}$ standard) at monitoring well MW-5 near the HWM building. These two compounds were not detected above their Class GA groundwater quality standards at the other twelve monitoring wells. All SVOCs were reported as not-detected or reported at concentrations below their respective Class GA groundwater quality standards. TAL metals, including arsenic, chromium, lead, manganese, selenium, thallium and zinc were reported above their respective Class GA groundwater quality standards. BBL compared the concentrations of these metals to the concentrations reported in background monitoring well MW-4 and concluded that the concentrations of metals are most likely representative of natural conditions (pp. 000799 - 000805 and 000820).

The sediment sampling program occurred during June and October 1995. Sediment samples were collected in drainage ditches at 42 on-site locations and two off-site locations collected immediately west of the railroad tracks in the drainage ditch leading to Sawmill

Creek. Sediment cores were collected at 25 of these locations for the analysis of subsurface sediment. Sediment core sample depths were 0.5 ft to 1.5 ft below the sediment/water interface. Four sediment samples were also collected at 1.5 ft to 2.0 ft below the sediment/water interface. Sediment samples from Sawmill Creek were not collected by NMPC as part of the RFI.

Concentrations of total PCBs in surface sediment samples ranged from not-detected to 4,000 mg/kg (site-specific guidance value of 0.1 mg/kg) (p. 000771). PCB concentrations in the two off-site sediment samples were 0.58 mg/kg and 0.62 mg/kg. PCB concentrations in sediment cores ranged from not-detected to 2,600 mg/kg.

Surface sediment samples from 18 locations were analyzed for VOCs. All analyses reported VOCs at concentrations below their respective site-specific guidance values.

SVOCs were detected at concentrations exceeding their respective site-specific guidance values at 15 surface sediment locations. The SVOCs include acenaphthene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, bis(2-ethylhexyl)phthalate, chrysene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and phenol. Sediment core samples were analyzed for SVOCs at six locations. Chrysene and 1,4-dichlorobenzene were the only SVOCs detected at concentrations above their respective site-specific guidance values in sediment cores.

TAL metals, including cadmium, chromium, copper, lead, mercury and zinc, were detected at concentrations exceeding the site-specific guidance values at 15 sediment locations. Concentrations of arsenic, chromium, copper, lead, nickel and zinc were

detected in one downstream off-site sediment sample above the site-specific guidance values (p. 000778).

Two sediment samples were analyzed for total petroleum hydrocarbons (TPH) and were compared to known products. TPH in one sample was found to be #2 fuel oil, while another sample was found to be 10W40 motor oil (pp. 000768 - 000780).

Surface water samples were collected in drainage ditches at four locations in June 1995. A second sample was collected at one location in October 1995. PCBs were reported as not-detected in all surface water samples. Chloroform was detected at a concentration of 15 $\mu\text{g/L}$ in one sample near Outfall B (Class A surface water standard of 7 $\mu\text{g/L}$). SVOCs were reported as not-detected or below their respective surface water standards (pp. 000782 - 000787, 000819). Surface water samples in Sawmill Creek were not collected by NMPC.

A biota study of the aquatic wildlife in the on-site drainage ditches and pond was conducted by NMPC in July 1996. Fish and frogs were selected as the biota for chemical analyses. Specimens were collected from five areas in the drainage ditches on the western side of the site. PCBs and PAHs were found in both specimen groups. Total PCB concentrations in fish ranged from 0.59 mg/kg (ppm) to 40 mg/kg with the highest concentrations reported adjacent to the storm sewer outfalls. PCB concentrations in frogs ranged from not-detected to 6 mg/kg with the highest concentrations again reported adjacent to the storm sewer outfalls. The current consumption tolerance level for total PCBs is 2 mg/kg, set by the Food and Drug Administration (Newell, et al., 1987). Two of the five fish samples contained PCBs at concentrations greater than 2 mg/kg, while two of the eight frog samples also contained PCBs at concentrations greater than 2 mg/kg. Although human consumption of the fish and frogs from the site is not likely, it is possible

that piscivorous wildlife could be impacted by consumption of contaminated prey with the levels of PCBs measured in the biota at this site. The Statement of Basis lists the performance criteria for PCB tissue concentration in the resident aquatic biota as 0.1 mg/kg.

PAHs detected in both fish and frogs included benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, phenanthrene, chrysene, fluoranthene and pyrene with concentrations ranging from not-detected to 0.33 mg/kg. The highest PAH concentrations in fish were reported from the section of the drainage ditch south of the culvert leading under the railroad tracks while the highest concentrations of PAHs in frogs were reported from the section of the drainage ditch adjacent to the storm sewer outfalls (BBL, 1997). Since some of the samples which contained PAHs also contained PCBs at concentrations greater than 2 mg/kg, piscivorous wildlife could be impacted by contaminated biota from this site. NMPC did not sample biota in Sawmill Creek.

PISCES (passive, in-situ concentration extraction sampler) data collected by NYSDEC's Simon Litten in 1995 from the water column of Sawmill Creek was reviewed. The PISCES provides a temporally-integrated sample for a period of about two weeks (Litten, 1996a). The sampler is intended to mimic the direct uptake of chemicals from water by fish without the complications of metabolism and the uncertainty of location of exposure (Litten, et al., 1993). The Sawmill Creek sample was collected at Onondaga Lake Park near the mouth of the creek (Station SM01). The levels of PCBs reported in Sawmill Creek (4 nanograms per liter [ng/L]) were similar to those found in other Onondaga Lake tributaries such as Onondaga Creek (6 ng/L), Ninemile Creek (4 ng/L) and Harbor Brook (2 ng/L). For comparison to known PCB-contaminated tributaries, the PISCES data in

Ley Creek and Bloody Brook indicated PCB concentrations of 205 ng/L and 106 ng/L, respectively (Litten, 1996b).

5.4 Impacts on Special Status Areas

According to the Brewerton, NY National Wetlands Inventory (NWI) map (USDOI, 1978), a small federal wetland (less than one acre), classified POWZ (Palustrine, Open Water, Intermittently Exposed/Permanent), exists near the southern border of the site. Several federal wetlands exist downstream of this wetland along Sawmill Creek. The RFI identified a federal jurisdictional wetland along the western side of the site which encompasses the drainage ditch areas. This wetland area, not shown on the NWI map, was likely delineated by NMPC. The state freshwater wetland closest to the site, designated BRE-24, is approximately 2,000 ft northwest of the site, along the western (opposite) side of Sawmill Creek, upstream of the site. Also, a large state wetland area designated SYW-1 (also a federal wetland) is located along the northern shore of the lake near the mouth of Sawmill Creek which is approximately 2.5 miles downstream of the site. A small state wetland designated SYW-3 is located just south of the New York State Thruway approximately 1.2 miles to the southwest. However, this wetland does not appear to be connected to Sawmill Creek and would not likely be affected by potential site contamination.

Adjacent to the site, Sawmill Creek is a Class C waterbody from its source upstream of the site to Route 57, which is approximately 1.3 miles downstream of the site. Sawmill Creek is a Class B waterbody, from Route 57 to the lake, downstream of the site and is thus considered a "protected stream" in New York State. According to 6 NYCRR Part 608 (Use and Protection of Waters), protected streams are those streams with the following classifications or standards: AA, AA(T), A, A(T), B, B(T), or C(T). As of

August 1996, there were no New York State Natural Heritage Sensitive Elements known in the immediate vicinity of the site (within one mile).

Sampling conducted during the RFI indicated significant impacts to the on-site federal jurisdictional wetland and aquatic biota. This wetland is to be remediated as part of the final remedy for this site (NYSDEC, 1997). PCB concentrations in sediments collected immediately downstream of the site were below the performance criteria of 1 mg/kg as identified in the NYSDEC Statement of Basis. Therefore, off-site sediments were not included in the final remediation, implying that the current potential for PCB migration from this area just downstream of the site is low. However, the potential historic impact to off-site downstream wetland areas and the protected stream portion of Sawmill Creek cannot be ruled out. The historic potential for contaminants to have impacted off-site wetland areas and Sawmill Creek is moderate.

6.0 SUMMARY OF CONCERNS

Analytical data from the Seventh North Street site indicate that contaminants, primarily PCBs and PAHs, and to a lesser extent VOCs, SVOCs (other than PAHs), and metals, have been released at the site and have entered the soil, groundwater, sediment, and/or biota at the site. Groundwater contamination appears to be limited to a small portion of the site. 1,1-Dichloroethane and 1,1,1-trichloroethane were detected in monitoring well MW-5, located near the Hazardous Waste Management building, at concentrations above the Class GA groundwater standards. As part of the final remedy for the site, NMPC is to conduct post-remedial monitoring of groundwater.

The primary pathway for contamination from the site to the lake system appears to be through the storm sewer drainage ditches and into Sawmill Creek. Current sediment sampling data in the culvert leading to Sawmill Creek immediately downstream (west) of the site indicate that PCB contamination is slightly above the site-specific guidance value of 0.1 mg/kg but below the performance criteria (also the recommended surface soil cleanup objective) of 1 mg/kg. The current potential for contamination to reach Sawmill Creek appears to be low. The storm sewer system was remediated in 1996 as part of an Interim Corrective Measure. As part of the final remedy, NMPC is required to conduct long-term monitoring of the storm sewer discharge to determine the effectiveness of this ICM. A second ICM at the site reduced the levels of PCBs and 1,1-dichloroethane beneath the Electric Meter Shop building, however soil concentrations of these contaminants remain above the recommended soil cleanup objectives. NMPC is required to conduct long-term monitoring of the groundwater to determine the effectiveness of this ICM. The proposed final remedy consists of excavating contaminated sediments in on-site drainage ditches to reduce future sources of PCBs and other contaminants to the lake system. NMPC is required to conduct long-term monitoring of resident aquatic biota

within the remediated on-site federal wetland area to assure that PCB tissue concentrations are 0.1 mg/kg or less.

Due to the length of operations at this site (hazardous waste handling began in 1966) and the unknown quantities of PCBs and other contaminants released into the site storm sewer system, the potential for these contaminants to have historically reached Sawmill Creek, a tributary of Onondaga Lake, is significant. NMPC did not collect samples in Sawmill Creek. NYSDEC sampling in 1996 reported PCB Aroclor 1260 at a low concentration (0.1 mg/kg) in Sawmill Creek sediment approximately one-half mile downstream of the NMPC site. Aroclor 1260 was the most prevalent PCB Aroclor noted in the on-site biota study (NMPC, August 1996). It should be noted that PCB Aroclor 1260 is also present in Onondaga Lake. However, a determination that the presence of this aroclor in the lake is due in part to this NMPC site has not been made.

The PISCES data collected in Sawmill Creek in 1995 reported relatively low concentrations of PCBs in comparison to other contaminated Onondaga Lake tributaries such as Ley Creek and Bloody Brook. Based on these data, Sawmill Creek does not appear to be a significant source of PCBs to Onondaga Lake at the present time. However, the homolog pattern of the Sawmill Creek PISCES sample is slightly different from other tributaries with low concentrations of total PCBs (Onondaga Creek, Ninemile Creek and Harbor Brook). This could suggest that PCBs in Sawmill Creek are from a local source in addition to background conditions caused by atmospheric deposition in the drainage basins. However, the low levels of PCBs in these samples are generally close to detection limits and, thus, the homolog patterns may not be accurate indicators of the presence of other sources.

REFERENCES

ATSDR (Agency for Toxic Substances and Disease Registry). U.S. Public Health Service. Toxicological Profiles. (Various Substances). Various dates, 1988 - 1993.

Blasland, Bouck & Lee, Inc. February 1996. RCRA Facility Investigation Report, Seventh North Service Center, Vol. I of IV.

Blasland, Bouck & Lee, Inc. January 1997. Focused Corrective Measures Study Report, Seventh North Service Center.

Effler, S.W. 1996. Limnological and Engineering Analysis of a Polluted Urban Lake: Prelude to Environmental Management of Onondaga Lake, New York.

Eisler, R. 1988. Lead Hazards To Fish, Wildlife, and Invertebrates: A Synoptic Review. US Fish Wildlife Service Biol. Rep. 85(1.14).

IRIS (Integrated Risk Information System). On-Line Database. U.S. Environmental Protection Agency. Database Searches, 1996 and 1997.

Litten, S., B. Mead, and J. Hassett. 1993. Application of Passive Samplers (PISCES) to Locating a Source of PCBs on the Black River, New York. Environmental Toxicology and Chemistry, Vol. 12, 1993.

Litten, S. 1996a. PCB Concentrations and Homolog Patterns in Ley Creek PISCES Samples. NYSDEC Memorandum to Bill Daigle from Simon Litten. (January 19, 1996).

Litten, S. 1996b. PISCES Data from Tributaries of Onondaga Lake. Files: ONON.XLS and AXYS.XLS (May 9, 1996).

New York State Department of Environmental Conservation. November 1993. Technical Guidance for Screening Contaminated Sediments. Division of Fish and Wildlife. Division of Marine Resources.

New York State Department of Environmental Conservation. January 24, 1994. Technical and Administrative Guidance Memorandum (TAGM) on Determination of Soil Cleanup Objectives and Cleanup Levels, #HWR-94-4046.

New York State Department of Environmental Conservation. May 14, 1997. Statement of Basis for the Niagara Mohawk Power Corporation Seventh North Service Center, Town of Clay, Onondaga County, New York.

New York State Department of Environmental Conservation. January 1998. Personal Communication from Alyse Peterson, NYSDEC to Paul Kareth, TAMS Consultants, Inc.

Newell, A.J., D.W. Johnson, and L.K. Allen. 1987. Niagara River Biota Contamination Project: Fish Flesh Criteria for Piscivorous Wildlife. NYSDEC Technical Report 87-3. July 1987. Reprinted July 1992.

Niagara Mohawk Power Corporation, April 4, 1995. Response to Request for Information.

Niagara Mohawk Power Corporation, April 28, 1995. Response to Request for Information.

Niagara Mohawk Power Corporation, February 9, 1996. Supplemental Response to Request for Information.

Niagara Mohawk Power Corporation. August 28, 1996. Letter report to NYSDEC summarizing the biota sampling activities in the drainage ditches performed by Blasland, Bouck & Lee.

Rickard, L.V. and D.W. Fischer. 1970. Geologic Map of New York, Finger Lakes Sheet (1:250,000). New York State Museum and Science Service Map and Chart Series Number 15.

Settle, D.M. and C.C. Patterson. 1980. Lead in Albacore: Guide to Lead Pollution in Americans. Science 207:1167-1176.

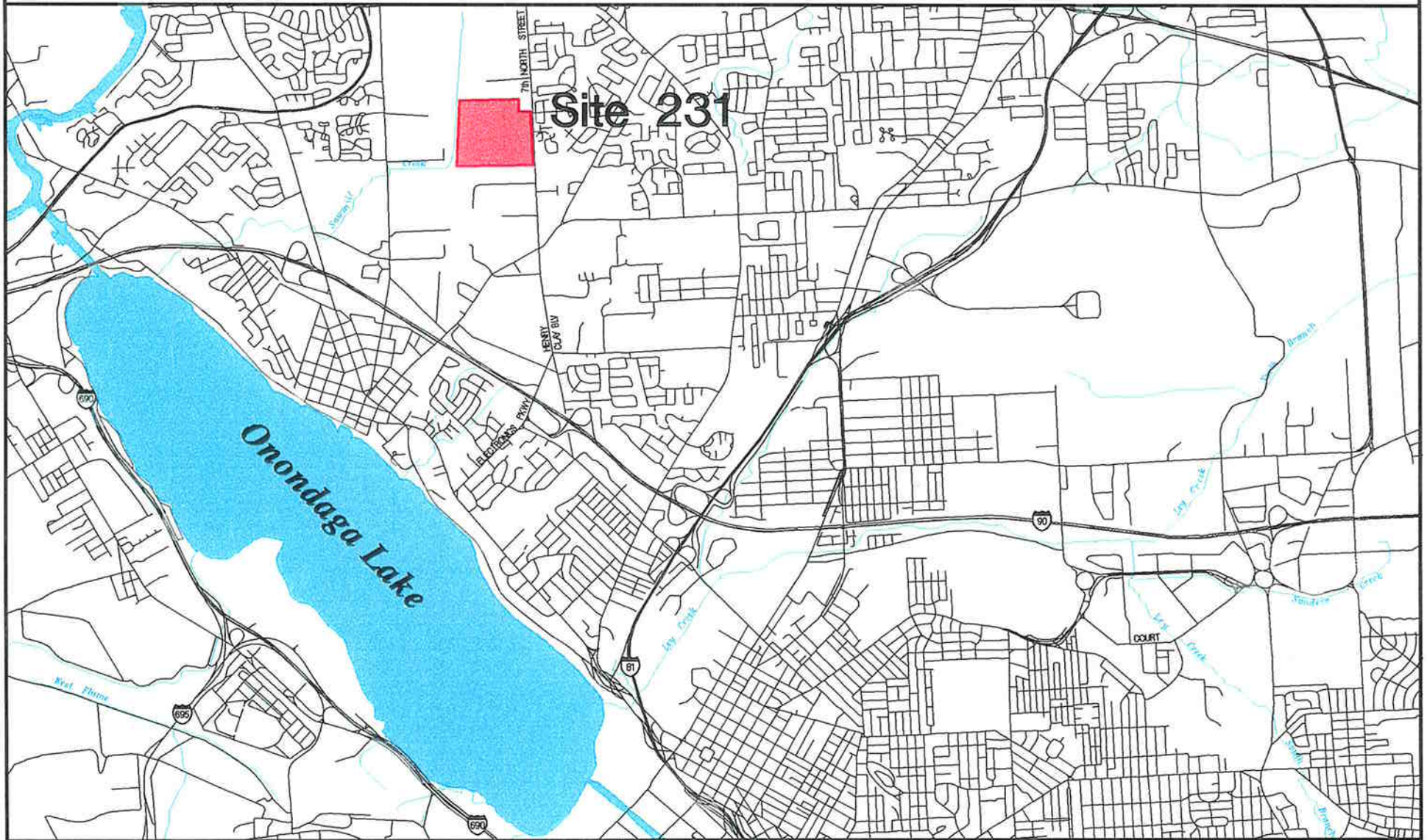
United States Department of the Interior (USDOI). Fish and Wildlife Service. 1978. National Wetlands Inventory Map. Brewerton, NY (1:24,000).

United States Environmental Protection Agency (USEPA). December 1979. Water-Related Environmental Fate of 129 Priority Pollutants, Volumes I & II. Washington, D.C.

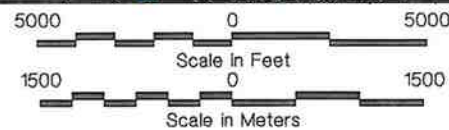
Upstate Freshwater Institute (UFI). 1994. The State of Onondaga Lake.

Wong, P.T.S., B.A. Silverburg, Y.K. Chau, and P.V. Hodson. 1978. Lead and the Aquatic Biota. The Biogeochemistry of Lead in the Environment. Part B. Biological Effects. Elsevier/North Holland Biomedical Press, Amsterdam.

Site Location: Niagara Mohawk Power Corporation Seventh North Street Site



Site Location



TAMS

Figure 1

Map source: Blasland, Bouck & Lee, Inc.
 Focused Corrective Measures Study Report, January 1997.

